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Supreme Court of the United States

OCTOBER TERM, 1976

No. 76-419

VERMONT YANKEE NUCLEAR POWER CORPORATION,
Petitioner,

v.

NATURAL RESOURCES DEFENSE COUNCIL, INC., et al.,
Respondents.

No. 76-528

CONSUMERS POWER COMPANY,
Petitioner,

v.

NELSON AESCHLIMAN, et al.,
Respondents.

APPENDIX TO BRIEF OF RESPONDENTS NATURAL RESOURCES DEFENSE COUNCIL INC., ET AL. IN NO. 76-419

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COMMENTS OF THE NATURAL RESOURCES DEFENSE COUNCIL, INC., ON THE ATOMIC ENERGY COMMISSION'S ENVIRONMENTAL SURVEY OF THE NUCLEAR FUEL CYCLE

Submitted by:

TERRY R. LASH, Ph.D.
January 26, 1973

I. INTRODUCTION

The Natural Resources Defense Council, Inc. (NRDC), finds the Environmental Survey of the Nuclear Fuel Cycle inadequate as a comprehensive analysis of the environmental impact of the nuclear fuel cycle and seriously deficient as a supporting document for the environmental impact statements of individual nuclear power plants. These defects are so serious that the survey is not useful for informing the public about the environmental effects of relying upon nuclear power plants as a major, national source of electrical power. Without a detailed study of the total environmental impact of the nuclear fuel cycle, a rational choice among the alternatives for electrical power production cannot be made. Therefore, the AEC should issue a revised survey in order to inform the public fully about the environmental consequences of using nuclear power plants to produce electrical power.

II. SCOPE OF SURVEY

Major defects of the survey statement are its failure to consider: (1) the *total* environmental impact of *all* nuclear power plants that are in operation, under construction or planned for construction; (2) the cumulative environmental effects over the entire lifetime of each plant; (3) the plutonium fuel cycle; and (4) the liquid metal fast breeder reactor. The environmental effects due to using nuclear power are apparently reduced by a factor of 200 to 1000 in the survey by considering only one plant rather than the aggregate of planned operational plants. Orders have already been placed for 177 nuclear power plants as of December, 1972, and it is estimated that 1000 plants will be in operation by the year 2000. (WASH-1250. The Safety of Nuclear Power Reactors and Related Facilities, December, 1972.) The total impact of all these nuclear power plants should

have been assessed in addition to the analysis of only one model plant.

Because each nuclear power plant may be used for 30-40 years, the environmental degradation caused over a plant's expected lifetime should have been reported. By normalizing outputs to one year of production the total environmental impact was apparently reduced by a factor of 30-40. Therefore, the cumulative consequences of constructing and operating a nuclear power plant should be listed in addition to its annual effects. Furthermore, the fate of the plant after it has stopped operating should be described. No mention of its continuing environmental hazard is made.

Plutonium is a natural fission product of a light water reactor (LWR) and must be handled at reprocessing plants. Furthermore, the reclaimed plutonium will be required as a fuel during a substantial portion of an LWR's 30-40 year design life due to the scarcity of the currently used fuel U-235. Thus the plutonium fuel cycle is central to the issue of nuclear power production. The fact that ". . . the prospective utilization of such plutonium recycle fuel is somewhat uncertain since the actual timing and the extent to which the recovered plutonium will be recycled is an economic matter to be considered by each utility" does not relieve the AEC from considering the *potential* environmental hazards of plutonium.

Plutonium is one of the most hazardous chemicals known. For plutonium dioxide particles about one micron in diameter, Donald Geesaman has estimated that for every 10,000 particles inhaled by a human population one fatal human lung cancer will occur. (GT-121-70, Plutonium and Public Health. Presented at University of Colorado, April 19, 1970). There is the same effect whether the 10,000 particles are inhaled by only one person or whether each of 10,000 people inhale one par-

ticle. By 1980 a model reprocessing plant will recover annually about 1500 metric tons of uranium and 8110 kilograms of plutonium. (John W. Gofman, In testimony before the Nuclear Study Committee of the Legislature of the State of South Carolina, Columbia, South Carolina, January 7, 1972). If only one-tenth of one percent of the annual production of plutonium were released as one micron sized particles and if only one-hundredth of one percent of the released particles were inhaled by humans, the plutonium would be responsible for 14 million fatal human lung cancers. Therefore a complete, detailed discussion about the processing, storage and transport of plutonium is required.

In the near future, plutonium will be used as fuel for liquid metal fast breeder reactors (LMFBR). The rapid development of LMFBR's is essential for the continued availability of relatively inexpensive nuclear power because they can utilize the most abundant U-238 isotope of uranium. The LWR's on the other hand can only use the relatively scarce U-235 isotope. Thus the facts that LMFBR's use plutonium and the LMFBR's are projected to become the major source of nuclear power in the next few decades strongly suggest that any discussion omitting LMFBR's is grossly deficient.

III. DISCISSION OF ENVIRONMENTAL IMPACT

Insufficient information for a realistic appraisal of environmental impact is presented in many parts of the survey. The omissions on two topics are especially disturbing. First, almost no consideration is given to the environmental consequence of rare or low probability events. For instance, in the discussion of temporary storage of liquid high-level radioactive wastes at reprocessing plants it is stated that ". . . the probability of an accidental release of radioactivity is considered to be extremely low and thus there would not be any signifi-

cant release to the environs." Not only are the very important qualifiers "extremely" and "significant" neither defined nor approximated in quantitative terms, but more importantly the potential results of substantial release to the surroundings are not even mentioned. The possibilities of evacuation of the local populous, the occurence of lung cancer among the exposed population, the costs of decontamination, and the possibilities of severe radiation exposure should be set forth in straightforward terms. Descriptions of the consequences of other events are similarly avoided by simply labeling them "incredible". The term incredible has no place in a technical report and it should be replaced by quantified probabilities. The dismissal of so-called low probability/high consequence events is not justified because there has not been a sufficiently long history of operating plants to judge probabilities accurately and because there is no way of predicting the chances of sabotage and terrorism against nuclear installations. Indeed, recent world and U.S. history suggest that even what were formerly incredible acts of violence now seem only too possible.

The second area containing major omissions is the discussion of long term storage of high-level radioactive wastes. No details about the "near-surface engineered storage facility" which will be built about 1980 are presented. Indeed, it is not even pointed out that the reprocessing plant operating at West Valley, New York, since 1966, apparently will not be able to comply with the AEC's regulation which prohibits the storage of high-level radioactive wastes at reprocessing plants for more than 10 years. More importantly, however, there is no discussion devoted to the problems associated with establishing a permanent, absolutely secure depository for the high-level radioactive wastes that will remain hazardous to man for tens of thousands of years. There is not even an analysis of the decision to no longer consider

the salt mines at Lyons, Kansas, as a satisfactory storage facility. A candid analysis of the necessity of permanently securing the high-level wastes and a full description of the requirements, including protection against sabotage, for permanent storage is needed.

The survey gives the impression of having been prepared hurriedly and almost carelessly. For instance, on page G-10, it is stated: "The spent fuel from a model LWR processed annually in a fuel reprocessing plant produces approximately 1000 gallons of radioactive liquid waste which, when converted to solid, weighs approximately 1.4-2.3 MT." Since for each ton of fuel reprocessed about 330 gallons on high-level liquid waste is produced, a model LWR yielding about 30 MT of spent fuel annually will produce about 10,000 gallons of liquid waste rather than the stated 1000 gallons. (WASH-1250. The Safety of Nuclear Power Reactors and Related Facilities, December, 1972.) Furthermore, Dr. Frank Pittman who is Director of the Division of Waste Management and Transportation at the Atomic Energy Commission has reported that a 1000 MWe nuclear power plant will produce about 8 tons of solidified waste rather than the stated 2 tons. (Remarks by Dr. Frank K. Pittman, before the American Nuclear Society Meeting, November 16, 1972.) Other errors can be found in the report, also. On page E-2 the amount (26 MT) of waste CaF_2 appears to have been underestimated by 30 percent if the figures given for the capacity of the model fuel fabrication plant are correct. About 34 MT of CaF_2 per model LWR plant would result annually from the neutralization of the UF_6 produced from 34.6 MTU which is the annual contribution from one model LWR. Thus, the presentation should be carefully reconsidered in order to eliminate these and any other gross errors.

IV. CONCLUSION

NRDC finds the Survey sufficiently inadequate in scope of content and in completeness of discussion that it cannot usefully serve either as a supporting document for individual environmental impact statements or as a comprehensive survey of the environmental impact of the nuclear fuel cycle. In order to assist the public in understanding the environmental implications of using nuclear power plants to meet the national electrical energy requirements, the survey must be enlarged to include complete and detailed discussions of the plutonium fuel cycle, the cumulative effects of the entire complement of nuclear power plants and the environmental impact of the fast breeder reactor program. The topics which are covered in the survey need to be analyzed more accurately and in greater detail.

Docket No. RM 50-3

In the Matter of

AMENDMENT OF 10 CFR PART 50—LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

(Environmental Effects of the Uranium Fuel Cycle)

COMMENTS OF THE SIERRA CLUB ON "ENVIRONMENTAL SURVEY OF THE NUCLEAR FUEL CYCLE"

The Sierra Club submits herewith its comments on the Commission's "Environmental Survey of the Nuclear Fuel Cycle" and requests that these comments be made part of the record of the rule-making hearing to be held on February 1 and 2, 1973. The comments are intended to supplement comments and testimony offered by the Consolidated National Intervenors, of which the Sierra Club is a member.

Our comments are in two parts: Part One contains general observations on the Survey and the Commission proceedings, and Part Two focuses on specific features of the Survey.

GENERAL COMMENTS

This Survey or a successor document is clearly intended to play an integral role in the Commission's efforts to comply with the National Environmental Policy Act (NEPA) in regard to the environmental impact of civilian nuclear fuel cycle operations. Although we note the Survey's statement that it is not intended to be a detailed environmental statement under the Commission's NEPA regulations, the Commission's notice of November 15, 1972 (37 Fed. Reg. 24191) indicates that it does propose to use the Survey as evidence that NEPA has been complied with in LWR licensing proceedings. Such

use is contemplated under each of the two alternative regulations on which comment is invited by the notice.

The Survey is a useful document in many respects, but the Sierra Club is convinced that it is not legally or technically sufficient for its intended use. Many of the most important environmental risks and costs associated with the supporting fuel cycle for the nuclear power industry have been arbitrarily omitted from consideration or incompletely analyzed. Among the most prominent of these are plutonium handling and recycling, long-term storage of high-level wastes and thermal pollution. Our detailed criticisms of these and other areas where the Survey is inadequate are contained in Part Two.

As a result of these shortcomings, the environmental costs of the fuel cycle are seriously underestimated in the Survey. Thus the conclusion, under consideration in the Commission's first alternative, that these costs are sufficiently small as not to affect the cost-benefit analysis for an LWR, is not tenable. Even if the Survey's omissions and inadequacies in specific areas of environmental impact were disregarded, it still would not support the conclusion that the costs of the fuel cycle are negligible. In the absence of a common denominator by which to make direct comparison of the costs and benefits of a particular LWR, the final decision embodies large elements of judgment and subjective evaluation. The Survey does not attempt to elucidate this process of judgment and evaluation with regard to the costs of the fuel cycle. For the most part, the Survey is an exercise in data collection which is useful as far as it goes, but does not resolve the problem of translating the data into a meaningful environmental assessment. The selective comparisons of fuel cycle impacts to the impacts of coal-fired plants or the nuclear power station itself are misleading and unproductive because no such comparisons

are drawn in areas such as radiological effluents, where the comparisons would be adverse to the fuel cycle facilities.

The Survey is also unsuitable for the use proposed in alternative 2 because the costs of the fuel cycle are not fairly and completely set forth. Under the Commission's Rules of Practice, the Survey would be effectively insulated from challenge in LWR licensing proceedings once adopted for use in the manner proposed. Any correction of its basic shortcomings would have to take place in further rule-making proceedings. Meanwhile, the validity of licensing proceedings conducted along the lines of alternative 2 would be in doubt because of these shortcomings.

Until the Commission has resolved the inadequacies of the present Survey by more extensive findings and investigation in these rule-making proceedings, we believe the environmental impacts of the fuel cycle must be subject to examination by the Staff, the licensing Boards and interveners in the NEPA phase of individual licensing proceedings. We also believe the Commission should recast these rule-making proceedings to provide for the rights of discovery and cross-examination. Only by permitting the probing review afforded by these procedures can the Commission satisfy the mandate of NEPA and the public's demand that the environmental costs of the fuel cycle be explored to the full limit of our present intelligence. In undertaking this initial Survey, the Commission has taken an important step toward its goal of a comprehensive and reliable generic evaluation of the fuel cycle's environmental effects. We believe it can sooner realize that goal by opening the process of investigation and analysis to fuller public scrutiny and participation.

SPECIFIC COMMENTS

Plutonium Recycling

The Survey's most serious omission is its failure to consider the environmental impact of plutonium recycling in light-water reactors (LWRs). The Survey states that recycling of plutonium will be considered as an alternative LWR fuel cycle in a later document, but no date for the document is given. (S-2). The apparent rationale for deferring this vital matter is that the advent of plutonium recycling will vary somewhat between utilities, according to economic situations. (F-16-17). This variation in timing is the only reason given for not considering plutonium in the present Survey. The Survey does not question that plutonium will be recycled in the present generation of LWRs, and in fact affirms that the feasibiliy of mixed plutonium-uranium dioxide fuels has been shown. (*Ibid.*).

A lengthy discussion of the staggering problems in handling plutonium on a large scale is not necessary. Plutonium's extraordinary toxicity, radioactivity and longevity are well-known sources of concern to everyone in the nuclear industry. Almost as disturbing are the possibilities that diverted plutonium produced in LWRs could be traded in an international black market and used for production of nuclear explosives by unauthorized parties.

At the assumed 80 per cent load factor, the 1000 MWe plant considered in the Survey will produce slightly less than 200 Kg of plutonium per year. The Survey's estimates that about 2-3 MT of plutonium will be recovered annually by 1975, and about 15 MT by 1980 (F-16), therefore correspond to about 10-15,000 MWe and 50,000 MWe of generating capacity respectively. The Survey's overview states, however, that there is

already 10,000-12,000 MWe of operational nuclear power plants in the United States (0-1). In addition, several more operating licenses have been granted in recent months. For 1980, the Survey estimates that 140,000-150,000 MWe of nuclear generating capacity will be operational. (0-4). Thus it appears that, by the Survey's own figures, the amount of fissile plutonium passing through reprocessing plants in 1975 and 1980 has been underestimated by a factor of at least 2 and possibly 3.

Some reactors are already being fueled with mixed plutonium fuel, including Consumers Power's Big Rock Point plant and the San Onofre plant of Southern California Edison. Other plants will soon follow suit or may already be doing so. One of the sources cited in the Survey states flatly that "plutonium recycle in LWRs is an economic necessity in the U.S." Dawson, *et al.*, *Plutonium Utilization in Light-Water Reactors*, 4th U.N. Int'l Conf. on Peaceful Uses of Atomic Energy, A/CONF 49/P/071 (Sept. 1971). At least two utilities (Consumers Power and Duke Power) have filed comments urging the Commission to consider plutonium recycling in these proceedings or related proceedings to be promptly instituted.

Certainly the variations in utility plans for use of plutonium fuel in LWRs present some difficulties in quantitative analysis of the resulting environmental impact, but these difficulties are not insurmountable. The Survey deals with similar problems in other areas, such as the alternate methods now in use for production of UF_6 (C-1-2), and the use of underground or open-pit mining for uranium (A-1). In the case of plutonium recycling, the analysis could proceed on the basis of either a best estimate by the Commission of the extent of such recycling by 1980 or a survey of utilities to determine their present plans for that period. Either method would yield at least a range of alternate futures that would be

vastly preferable to the absence of any analysis in the present Survey. Furthermore, the problems of handling plutonium in the LWR fuel cycle can be meaningfully discussed even though the magnitude and timing of recycling are uncertain. The environmental challenges are immense even if only a very small fraction of the plutonium produced by LWRs is recycled. Thus the model reprocessing plant servicing the annual needs of 26 LWRs will be handling more than 5 MT of plutonium per year, even if the material is stored rather than recycled. The tolerable releases of plutonium to the environment through losses in reprocessing are extremely small, yet Section F of the Survey contains no discussion of either the existing or expected magnitude of these releases. Similarly, in the event of recycling, process losses at the fabrication plants would have to be drastically reduced from the 1% levels assumed for uranium (S-6), in order to limit plutonium releases to tolerable amounts. Yet the abilities of the reprocessing and fabrication plants to limit such losses are not discussed.

HTGR Fuel Cycle

The fuel cycle of the high-temperature gas reactor (HTGR) presents a series of difficult problems, particularly in dealing with fission products. We can agree that attempting to treat those problems in the present Survey might have detracted from the Survey's coherence. The recent increase in utility orders for the HTGR shows, however, that the environmental impact of its fuel cycle must be addressed at a very early date. The Survey gives no date for comparable proceedings in regard to the HTGR. Failing such proceedings, complete analysis of fuel cycle environmental effects in reactor licensing proceedings will be the only available method for compliance with the National Environmental Policy Act of 1969.

Thermal Pollution

The Survey fails to quantify or discuss in any significant way the thermal pollution associated with the fuel cycle. According to the Survey, the supporting fuel cycle for a 1000 MWe reactor consumes electrical energy equal to 4 to 5 per cent of the reactor's annual output and produces waste heat equal to about 7 per cent of that produced by the reactor (S-14, S-16). In both instances, the effect is overwhelmingly concentrated in the enrichment phase of the fuel cycle and is chargeable to the operations of the three gaseous diffusion plants existing in the United States (S-17). These effects are by no means insignificant, despite the modest appearance of the percentages. Any single industry or consumer which accounted for 4 to 5 per cent of the electric energy generated by nuclear power stations would have to receive major consideration in a demand-oriented analysis of the environmental effects of producing that energy. Similarly, since thermal electric generating plants are the major source of waste heat discharged to the biosphere and nuclear power plants contribute disproportionately to that effluent, an industry which discharges to the environment an amount of waste heat equal to 7 per cent of that discharged by all nuclear power plants is an important potential source of thermal pollution.

After quantifying these effects, however, the Survey does nothing toward analyzing their impact. The Survey dismisses the entire problem on the basis that the electricity which powers the diffusion plants is drawn from large utilities which discharge effluent to many water bodies, and the effect is therefore difficult to estimate. (S-36, D-5, D-13, D-26-27).

The Survey could have discussed this problem in meaningful terms, notwithstanding the difficulties in pinpointing the precise contribution of the nuclear fuel cycle to thermal pollution of affected water bodies. The power

in question comes from three utilities. (D-13). What are the major bodies of water which receive the discharges from the generating stations of these utilities? What contribution are these discharges making to the thermal load imposed on these water bodies, and what evidence exists that thermal loading is causing adverse effects to these water bodies and their biota? What portion of the power generated by these utilities is delivered to the gaseous diffusion plants, and what portion of the incremental demand for power from these utilities is represented by projected expansion of operations at these plants for civilian fuel production? Questions such as these could be the starting-point for a meaningful discussion of thermal pollution caused by the fuel cycle, even if limitations of data prevented a complete answer at present. Unfortunately, the Survey offers no encouragement that these questions were even asked. This omission takes on added importance because the Survey elsewhere relies on the future substitution of nuclear power plants for coal-fired plants in powering the gaseous diffusion plants as a source of environmental improvement. (O-14, 15). These projected future benefits must be discounted by the increased thermal pollution that is likely to result.

Total Environmental Impact of the Fuel Cycle

A critical defect in the Survey is that the *total* environmental impact of the fuel cycle is not set forth at any point. Although the Survey is replete with tables and charts, many of which are very helpful, the Survey merely suggests that the effects of the entire fuel cycle for the present and for 1980 can be arrived at by performing an extended series of computations from various other tables. (S-44). Conceivably, the total effects of the fuel cycle are treated in this peripheral way in the belief that only the incremental impact of a single plant is relevant in the licensing proceedings where the Survey

is designed to be used. Clearly it is important to know this incremental impact, but it is equally important for decision-making purposes to assess the acceptability of that impact in light of the collective effect that many similar decisions will ultimately have. Otherwise, the mistakes of the past may be repeated through the "tyranny of small decisions" against which the NEPA is directed. We find it very regrettable that the Survey does not candidly state the net impact of the LWR fuel cycle. In this respect the Survey belies its own title, and this defect alone casts a grave doubt on the propriety of its use in individaul licensing proceedings.

Fuel Cycle Effects After 1980

A related defect is the Survey's failure to address the problem of environmental impacts beyond the 8-year time frame to which it is limited. Admittedly, forecasts become less reliable as the time frame lengthens, and at some point they enter the realm of speculation. Nevertheless, the Survey must address these longer-term questions. It assumes that the model LWR will have an operating life of 30 years. (S-7). Thus reactors licensed in the present decade will have fuel cycle effects until the year 2010 in some cases. If these post-1980 effects are not assessed now, they will never be assessed for the present generation of LWRs. Since other benefits and costs of these reactors are calculated in relation to the reactor's entire useful life, the environmental costs of the supporting fuel cycle are underestimated if the analysis stops at the year 1980. If no further analysis is considered feasible at this point, the Commission should explore the possibility of periodically reviewing the fuel cycle impact of LWRs as this impact becomes more clearly defined with the passage of time. At the very least, there should be an explicit commitment to periodic updating of the Survey itself; otherwise, a reactor might

be licensed in 1978 with consideration of the fuel cycle effects extending only to 1980. The process of periodic review should include hearings giving members of the public the opportunity to contribute to the review and to probe the bases of the Survey's conclusions.

Radioactive Releases "As Low As Practicable"

The Survey does not explore in any manner the application to the operations of the fuel cycle of the concept that releases of radioactive effluents should be "as low as practicable." Throughout the discussion, release rates are compared to the maximum permissible concentrations set forth in 10 CFR 20, and the possibility of developing quantitative equivalents of "as low as practicable" similar to those in proposed Appendix I for nuclear power stations is not considered. Whether or not a specified environmental cost is tolerable depends considerably on whether it can reasonably be avoided. On this point, the Survey is uninformative and the problem is not satisfactorily addressed by the qualification (not consistently adhered to throughout the Survey, in any event) that only minimal allowance is made for future technological advances. We agree that the Survey should confine itself to present techniques and not speculate on future achievements. This does not mean, however, that the Survey should ignore any technology which is *presently available* but not incorporated in present facilities for economic or other reasons. A complete Survey must examine such possibilities, particularly in regard to the practicability of reducing radioactive effluents below existing levels in accordance with the overriding mandate of 10 CFR 20.1(c). In addition, the release rates are apparently based in several instances on AEC projections or information furnished by the operators of the facilities, rather than recorded data. (S-11, S-12). In light of the recent disclosure that releases from the Vermont Yankee plant are 3-8 times

greater than advance projections, the possibility that present releases are greater than the assigned figures is clearly suggested.

Liquid Effluents

Throughout the Survey there is reliance on dilution by water bodies to achieve even those concentrations permitted by Part 20. (S-32, D-26). This approach is questionable not only from the standpoint of radiation control, but equally from that of water quality control. Similarly, in respect to chemical effluents, the Survey relies on dilution to achieve "source water quality." (S-27, D-24, E-23, 24). Under the 1972 Amendments to the Federal Water Pollution Control Act now in effect, (P.L. 92-500), water quality standards will largely be supplanted by effluent standards for individual dischargers. The key indicator of the environmental impact of point sources such as those discussed in the Survey, therefore, is not the condition of the receiving water after full dilution, but the quality of the effluent itself. Since the Survey's reliance on 1968 Water Quality Criteria is now outmoded, all portions concerning discharges to navigable waters must be revised as the Environmental Protection Agency establishes effluent requirements applicable to the facilities in question.

Storage of High-Level Wastes

The Survey attempts to deal with the problem of interim and long-term storage of high-level radioactive wastes by denying that any such problem exists. The reader is merely assured that the Commission will design and build a storage facility within the next ten years that will preclude significant releases to the environment for 100 years, and that this 100 years will be utilized to discover a more permanent method that will likewise preclude such releases. (S-43, G-3, G-11, G-18,

G-20). In a religious document, this would be considered an article of faith.

No concept or details of the storage facility are set forth; hence there is no discussion of the probabilities of accidental releases, but only the bald statement that "the facility will be designed to withstand all credible natural forces and man-created accidents so there will be no release of radioactive material outside the facility." (G-20). If some other structure such as a bridge were in question, the presence of such unsolved problems might be tolerated on the assumption that the facility would not be constructed until the problems were solved, however long that took. This approach is not acceptable for a structure that *must* be built in a rather restricted time frame. Indeed, the Survey shows even though it does not directly concede, that the time may already be too short for full compliance with the requirement in Appendix F of 10 CFR Part 50 that high-level wastes be transferred to a Federal repository no more than 10 years after separation from the spent fuel. Even the brief discussion in Section G of the Survey shows that construction of the interim storage facility will be a large and complex undertaking. Plans are now said to be in the development stage, but there is no indication when a specific concept will be put forward for examination prior to preparation of detailed plans and specifications. (G-11). Furthermore, it appears from the meager information provided that no allowance has been made for unsuspected problems, re-evaluation and even abandonment of the plans as in the case of salt mine storage. Thus there are valid grounds to question whether the 1980 commitment is realistic and achievable. If it is not, Appendix F in its present form will be seriously violated. Amending the regulation would solve the problem in a technical sense, but the requirement was presumably adopted with due regard for the

hazards and limitations of on-site storage at the reprocessing plants, and there is no evidence that it is unduly conservative. Hence the Survey is totally inadequate in its treatment of a paramount environmental problem which neither the Commission nor the civilian nuclear industry can escape.

Major Accidents

The Survey's treatment of accidents is flawed by a persuasive tendency to classify the most serious kinds of accidents as "highly improbable" (S-36), "infinitesimally small," (S-43), etc., without specific supporting estimates of probability. Without question the probabilities of the most serious types of accident are very low, but this affords no excuse for failing to assess any probabilities greater than zero. Even very low probabilities can assume significance in light of the projected growth of the civilian nuclear power industry within the lifetime of the LWRs now being licensed and the concomitant growth of fuel cycle operations. In relation to the magnitude of these future operations, our experience to date is so limited that it has very little statistical significance as a guarantee of safety.

Effluents In "Restricted Areas"

The Survey implies at several places that waste discharges allegedly confined to "restricted areas" need not be considered as effluents to the environment (*e.g.*, S-27, B-20). These statements appear to reflect the belief that environmental harms can be disregarded by classifying the area in which they occur as restricted. We do not question the designation of certain areas as "restricted" for the purposes of protecting the public health and safety, but this does not mean that the areas so designated are no longer part of the environment. The Survey treats many of these areas as land temporarily committed, but there is little or no discussion of how much time and money will be required to return these areas to unrestricted use at termination of the activities in question. Appendix F of 10 CFR Part 50 states with respect to fuel reprocessing plants, for example, that "a design objective . . . shall be to facilitate decontamination and removal of all significant radioactive wastes at the time the facility is permanently decommissioned. Criteria for the extent of decontamination to be required upon decommissioning and license termination will be developed in consultation with competent groups." The Survey does not refer to any such criteria, and we are not aware that any have been promulgated by the Commission. Therefore, considerable uncertainty exists as to the realistic possibilities for overcoming the environmental damage caused to restricted areas and returning them to a benign condition.

Moreover, there have already been instances where effluents supposedly confined to restricted areas have penetrated the off-site environment. The most notable of these is of course the use of uranium mill tailings for construction in the Grand Junction area (see, *e.g.*, 37 Fed. Reg. 25918, Grand Junction Remedial Criteria). But in addition, radioactive material has been leached from tailings by rain water and entered the ground water system, resulting in excess downstream concentrations in the Colorado River. Windblown plutonium from wastes at the Rocky Flats weapons production facility likewise caused excessive off-site concentrations. These experiences bring into serious question the Survey's premise that effluent discharges in restricted areas are without environmental significance.

Violations of Effluent Standards

The Survey is ambiguous in many instances on whether discharges from fuel cycle facilities are or are not violating applicable standards. At S-26, fluoride concentrations of .005-2.0 micrograms/m ^{3} are said to "span the range of existing state standards," even though they apparently exceed the Washington State standard of 0.5 micrograms/m ^{3}. At S-28, enrichment plant liquid effluents are described as "generally within the range of permissible standards." This description could encompass any situation from occasional minor violations to frequent large-scale transgressions. At D-21, the Survey states with no further elaboration that an off-site SO_2 concentration of .025 ppm is "within the range" of EPA's annual mean standards of .02 ppm. In plain English, it exceeds the standard. Similar lapses of candor are present in other instances where the Survey encounters emissions which exceed the reference standards. (*E.g.*, B-15). Since the Survey consistently regards compliance with radiological and other standards as evidence of satisfactory environmental performance, the public is entitled to have a clear statement of those many instances where even this degree of assurance is absent.

Long-term Buildup of Krypton 85

The Survey states at the outset that it is unrealistic to express concentrations and dose rates in terms of the annual operation of the model LWR and that such radiological considerations will be expressed with reference to operations of the fuel cycle facilities themselves (S-11). In the important case of krypton 85, however, the Survey does not discuss long-term buildup in the atmosphere from the overall operations of the reprocessing plants, but only from the minor contribution attributable to the model LWR. (S-31, F-5). Thus the Survey does not

even provide the baseline data for a meaningful discussion of the problem, and no such discussion is found.

Respectfully submitted,

SIERRA CLUB

By John D. Hoffman
JOHN D. HOFFMAN
Sierra Club Legal Defense Fund, Inc.

ENVIRONMENTAL PROTECTION AGENCY
RADIATION OFFICE
Rockville, Maryland 20852

January 19, 1973

Secretary
U. S. Atomic Energy Commission
Washington, D. C. 20545

ATTN: Chief, Public Proceedings Branch

Dear Sir:

The AEC rulemaking proposal on amendment to 10 CFR Part 50, Appendix D, published in the *Federal Register* on November 15, 1972, which "would specifically deal with the question of consideration of environmental effects associated with the uranium fuel cycle in the individual cost-benefit analyses for light-water-cooled nuclear power reactors" has been reviewed. The EPA has expressed the intention to be a limited participant in the proposed hearing by memorandum to the AEC dated December 29, 1972. The comments offered below will be expanded by oral testimony at that time.

Ideally, we believe that in evaluating the environmental effects of the fuel cycle as related to a reactor, such effects, to the extent possible, should be related to the specific fuel cycle plants that support a given reactor. We recognize that at present and for the presently foreseeable future it would be impracticable to adopt such an approach because this kind of information is not available. Therefore, within the confines indicated below we are in agreement with the generic approach used by the AEC in its report, and believe the report provides an adequate consideration of the environmental effects of the present

uranium fuel cycle for purposes of the rulemaking. The AEC is to be commended for considering the total fuel cycle in evaluating the environmental aspects of light water reactors and should be encouraged to pursue this effort.

In view of the expected growth in nuclear power and the development of new and improved technology, we recommend that the AEC make it clear that it does not intend by this rulemaking action to foreclose future consideration of fuel cycle impact as related to reactors. This assurance can be given by stating in the rule that the environmental effect of the fuel cycle will be periodically evaluated and updated as new information is developed. We believe an effective period for the guidelines should be specified. We recommend a 2-year period in support of this position. One specific area that should be further examined is the disposition of high-level waste. While the concepts of dealing with such wastes have been developed, the detailed criteria being developed need to be evaluated in terms of environmental impact. Another specific area concerns radiological dose assessment. The AEC report considers average contribution of the total nuclear fuel cycle to the total environmental impact of a specific nuclear reactor. We believe that in the future as more data becomes available, estimates of regional impact should be made. In addition the control technologies for risk reduction and the procedures for evaluating the environmental impact of effluents are in a constant state of development as new techniques, methods, and information become available. This requires a periodic reexamination of the policies and procedures used for evaluation of the environmental impact of nuclear facilities. This problem of constantly evolving technology and the difficulty in quantifying the prorated impact of all fuel components, further supports our belief that periodic reassessment of the total environmental impact of the fuel cycle is essential.

Neither of the two alternatives proposed specifically address the problem of periodic review in a specified time period. As such, we feel they are unacceptable without modification. We recommend that Alternative 1 be adopted with the provision of periodic reassessment of fuel cycle input, the first period for reassessment being no longer than two years.

The EPA does not entirely concur with that section of Alternative 1 of the proposed rulemaking which states that ". . . since the environmental effects of those activities as related to a particular light-water-cooled nuclear power reactor have been analyzed in the Commission's *Environmental Survey of the Nuclear Fuel Cycle* and when factored into the cost-benefit analysis, are sufficiently small as not to affect significantly the resultant conclusion." We believe this to be a judgment factor which may change as additional information is developed. However, within the above-recommended limited effective period of the proposed rulemaking, we do agree that the committed environmental impact will be sufficiently small to justify such a statement. This recommendation in no way diminishes the responsibility of the EPA to set generally applicable environmental standards for the total uranium fuel cycle and for its components.

As an additional comment not related to the rulemaking, we feel that this approach of looking at the total uranium fuel cycle is typical of that required for the broader issues associated with electric power generation and we recommend that AEC undertake studies of other fuel cycles, including non-nuclear, so there will be a base for assessing and comparing the cost-benefit for all the cycles.

In summary, the EPA believes that a more detailed follow-on assessment of the potential environmental impact of the total nuclear fuel cycle should be actively pursued by the AEC. In the final analysis, any decisions on the environmental impact of the nuclear fuel cycle must take into consideration similar impacts of other fuel cycles in order to determine the electrical energy source mix most suitable for this nation. Also, efforts should be expanded to develop appropriate guidelines and standards applicable to components of the nuclear fuel cycle. More specific comments on the Commission's "*Environmental Survey of the Nuclear Fuel Cycle*" are enclosed.

Sincerely yours,

/s/ W. D. Rowe
W. D. Rowe
Deputy Assistant Administrator
for Radiation Programs

Enclosure

cc:
Mr. M. D. Paglin, Chairman
Dr. J. C. Geyer
Dr. M. J. Steindler
Atomic Safety & Licensing Board Panel, USAEC

SPECIFIC COMMENTS ON ENVIRONMENTAL SURVEY OF THE NUCLEAR FUEL CYCLE

A. RADIOLOGICAL ASPECTS

1. Discussion of waste disposal is not complete enough in that it indicates that potential environmental releases will be avoided by design

without indicating how or describing potential releases that will be designed against. The ultimate disposal of radioactive wastes produced as a result of nuclear power generation is a critical parameter in the evaluation of the total environmental impact of this energy system. Although an acceptable ultimate disposal methodology has not been determined, the criteria that will be utilized in deciding on such a methodology should be set forth in any complete fuel cycle evaluation. These criteria should indicate what present and future risks the AEC would consider justifiable in a cost-risk-benefit analysis. An evaluation should be made of the chances for developing a methodology to meet these criteria and what compromises would be considered. Other specific comments on the waste disposal evaluation are:

(a) It does not include the disposal of "other than high-level wastes" produced by the reactor operation.

(b) It presents insufficient discussion of fuel hulls.

(c) The model of the high-level interim storage facility is inadequate.

2. The discussion of accidents for all components should present probabilities associated with the various consequences.

3. Since the report does not consider the HTGR, a more descriptive title would be "Environmental Survey of the Light-Water Reactor Fuel Cycle."

4. There is a lack of a consistent format for expressing the radiological effects of the various components of the fuel cycle. For some of the

components, the effects are presented in terms of percentages of the 10 CFR 20 Appendix B limits at the site boundary; such is the case for milling, UF_6 production, uranium enrichment, and fuel fabrication. For the fuel reprocessing and transportation components, dose estimates are presented but not in a consistent format which will allow comparison of the various components of the fuel cycle. Some data on man-rem doses for fuel reprocessing and milling are presented in the Summary Table S-3, but no information on these doses is presented in the individual sections of the report devoted to these components of the fuel cycle.

It is suggested that the radiological effects of all of the various components of the fuel cycle be presented in terms of estimated man-rem dose to the population effected. It should also include information on doses to the maximum individual.

5. The information presented in Table S-3 on the discharges of radionuclides from milling and UF_6 production includes amounts of radionuclides discharged as liquids to on-site holding ponds. Since it is indicated that these radionuclides are not discharged to the uncontrolled environment, they should not be included in the effluent activity.

6. Table S-3 presented in the *Federal Register* of November 15, 1972 contains some values in the section under Radiological Effluents which are inconsistent with Table S-3 as presented in the *Environmental Survey of the Nuclear Fuel Cycle.* The liquid discharge of ^{234}Th and other uranium daughters are listed in the *Federal Register* as 0.001 curies and in the *Environmental Survey* as 0.01 curies. The tritium gaseous effluent in

the *Federal Register* is listed as 12 curies and in the *Environmental Survey* as 15.7 curies.

7. In the section under "Uranium Milling," it should be clearly stated how the AEC intends to regulate the stabilization and control of decommissioned uranium mill tailings ponds. A number of states with ongoing uranium milling activities do not have uranium mill tailings control regulations. The discussion presented in this section leaves the impression that no tailings control problems will exist under the present practices. The discussion in this section also indicates that tailing ponds are designed to prevent contamination of ground or surface water. This is definitely not the case for several of the mills located in EPA Region VIII (Colorado, Utah, Wyoming, and Montana). For instance, several mill ponds have been identified as leaching contaminants to the underlying strata containing ground water. Also, the Union Carbide Uranium Mill discharges on the average of 200 gpm of processed water effluent to the San Miguel River. This effluent contains over 10 g/1 of total dissolved solids which includes sulfate concentrations greater than 3.5 g/1.

8. In the section under "Fuel Fabrication" it would be appropriate to point out the differences in hazards of different chemical forms and enrichments of uranium. Soluble forms of uranium with less than 5% enrichment are a chemical hazard with the organ of interest being the kidney. All insoluble forms (UO_2 as an example) are a radiological hazard with the lung being the organ of interest. The above discussion is important in a public document since chemical toxicity is assumed to be a threshold effect and

radiological effects are assumed to be non-threshold.

9. The iodine removal efficiency of 99.9% for fuel reprocessing plants appears to be optimistic based on past experience. The values for iodine discharges and resultant doses should be qualified with a statement indicating that the removal technology is unproven.

10. Strontium-90 and cesium-137 were shown to be the most dosimetrically significant radionuclides in the liquid effluents at Nuclear Fuel Services. Although the new waste treatment facility should reduce the significance of these radionuclides in the liquid effluent, it would still be appropriate to discuss the quantities of these radionuclides to be discharged and their dosimetric significance.

11. The volumes of low-level solid waste generated at a fuel reprocessing plant are presented in Table F-6 based on estimates from the Barnwell Environmental Report. Would it not be more appropriate to use the actual information obtained from the Nuclear Fuel Services? At least an indication of the variability and the reasons for it should be stated. Also, the data presented in Table F-6 on Page F-27 has no units.

12. A figure of 10^{20} fissions for a criticality accident at a fuel reprocessing plant may be a more conservative value than the 10^{18} fissions used in this report. The Midwest Fuel Recovery Plant uses a value of 10^{20} in their PSAR. Also, an accident at ICPP is reported to have exceeded 10^{18} fissions.

13. The Barnwell Environmental Impact Statement estimated 8 rail accidents per 10^6 train miles. A value of 0.8 accidents per 10^6 rail miles was

used in this report. The discrepancy should be resolved.

14. The dose to bone from the transuranic elements appears to be expressed as a yearly dose. It would be better expressed as a 50 year dose commitment resulting from an annual release.

15. The safeguard issue should be considered under the transportation section. A discussion of the procedures to be used for protecting the shipments against highjacking would appear to be appropriate as well as an evaluation of the possible consequences of a highjacking.

B. AIR QUALITY ASPECTS

1. In general we find the subject document to be a relatively complete overview of the non-radioactive air quality aspects of the nuclear fuel cycle. It seems likely that some of the non-radioactive air pollution emission estimates are a little on the low side. However, without more precise information about the type and size of equipment, fuel specifications and quantities to be used at the various facilities discussed, these estimates appear to be as good as any others would be.

2. A discussion of measures to be implemented for the control of evaporative hydrocarbons from bulk fuel storage at any of these facilities should be provided.

3. Oxides of nitrogen should be added to the list of combustion products of petroleum used to fuel the heavy earth moving equipment discussed on page A-16. Furthermore, some quantitative estimates of the emission levels should be provided.

4. The small quantities of sulfuric acid fumes, kerosene and dust mentioned on pages B-5 and B-14 should be quantified.

5. The 0.025 ppm off-site concentration of SO_2 (page D-21) is within the current Primary Ambient Air Standard; however, some additional SO_2 control will have to be installed to meet the Secondary Standard when they eventually become mandatory.

6. Some discussion of methods utilized to control dust should be provided in the section considering radioactive waste management.

C. WATER QUALITY ASPECTS

1. EPA does not believe that effluent dilution is an acceptable method of effluent control. There are several references in this report to the dilution of waste effluent streams prior to discharge to the environment. It is not clear as to whether this is a control mechanism or merely a statement of practice. Additional information on the methods of effluent control is necessary to determine if the procedures being used are acceptable.

2. The discussion of "accident consideration" relating to the milling operation, it is not clear whether the 5-foot minimum free board requirement takes into consideration flash flooding which is common to that geographical area.

3. The sections on accident considerations should discuss in greater detail the contamination of waterways resulting from potential accidents. For example, in the section under "uranium hexafluoride production," it is stated that a dike

failure would result in a significant environmental insult. More information on this effect should be presented.

4. The section on uranium enrichment should contain a discussion of the proposed water supply which would be used for a large scale uranium enrichment plant. This consideration should be carefully explored since it represents the "maximum case" for water natural resource utilization.

5. The section on the "overview of the total nuclear fuel cycle" should include a discussion of the future total water requirement.

6. More information is required on mixing zones, steam characteristics, etc. with respect to thermal discharges. The maximum temperature of any river should not be above 90° F for warm water fisheries. A 50° F rise in a trout stream may be a lethal load.

7. The Water Quality Criteria presented in Table D-8 may be changed within a short period of time to more restrictive values.

UNITED STATES DEPARTMENT
OF THE INTERIOR
OFFICE OF THE SECRETARY
Washington, D.C. 20240

February 23, 1973

ER-72/1437

Dear Mr. Secretary:

This is in response to Mr. Smiley's letter of November 21, 1972, inviting our comments on the Atomic Energy Commission's report entitled "Environmental Survey of the Nuclear Fuel Cycle," dated November 1972.

We are pleased that the AEC has published this Environmental Survey of the Nuclear Fuel Cycle. Much of the data given in this report is needed to supplement information normally given in environmental statements for individual nuclear reactors. However, since the report must cover such a wide spectrum to supply the information lacking in the individual environmental evaluations, we believe that the November 1972 issue should be significantly enlarged and modified if it is to fill the present need.

General

The discussion of the effects on the environment are in most instances very general in this report. We recognize that separate environmental statements on individual operations go into greater detail.

There is an implication throughout the document that the "environment" begins and ends at the site boundary of any nuclear facility; hence, any release will have no environmental effect if it is confined within the site boundary.

There are a vast number of retention ponds, settlement basins, and tailing ponds described throughout the report,

the construction of which do not appear to be limited to any engineering standards. These various impoundments contain large volumes of fluids and particulate matter of various degrees of activity and toxicity. The history of failures of such facilities is vast and many have resulted in widespread and significant environmental damage. The assumption is made for several operations that chemical or radioactive wastes buried or held in retention ponds will not give rise to effluents and will have no environmental effects. We do not think that this assumption is generally acceptable. Long-term action of ground and surface water on these wastes should be considered and evaluated before such an assumption is made.

Although the release of radionuclides is closely controlled as to concentration, much of this control is exercised by dilution in the medium to which they are released; hence, appreciable quantities may be released, albeit, in low concentrations. This rationale does not give consideration for the possibility that reconcentration of these radionuclides can take place within the natural systems to which they are released.

The report also appears to omit the consideration of some operations which are part of the fuel cycle. Among these are the solidification of high-level wastes, cleanup operations after accidents involving radioactive materials, and eventual disposal of major contaminated components of facilities.

The solidification of liquid high-level wastes, while not presently operational, will soon be a required step in the fuel cycle. It would appear that the subject report should include consideration of potential wastes or accidents involved in this operation.

Accidents at nuclear facilities, including reactors, are likely to produce radioactive liquids or solids that must

be further treated or stored. Cleanup operations inside or outside the plants and those associated with mining operations involve cleanup operations as well as disposal of damaged or contaminated facilities. The report should consider the quantities of contaminated materials that might be involved and the effects of their disposal.

We think the report should also consider the effects of the eventual disposal of contaminated facilities and major components after the end of their useful life. Such consideration for elements such as reactor components would be included since the effects of decommissioning are not usually evaluated in the environmental statements issued for individual reactors.

The report also deals with the disposition of high-level radioactive wastes and purified plutonium but does not describe the enormous potential for damage to the environment that is inherent in these materials. Without discussion of the nature of these dangers, it is not possible to evaluate the adequacy of the procedures intended to avoid them. Since these dangers are not usually discussed in environmental statements on individual operations of nuclear reactors, any overall coverage, such as appears to have been the intent of this report, should be thorough and detailed.

This survey report uses average statistics based on the present production situation. Since much of this production is committed to meeting existing uranium needs, we think that it would be more realistic to project the production cycle based on the life of future new plants.

Throughout the document, reference is made to land used for a particular phase of the nuclear fuel cycle as temporary. Since much of the lands used in the nuclear fuel cycle requires fencing or considerable elapsed time before it can be rehabilitated, we believe that the use of the term "temporary" is misleading. We suggest that such lands

be labeled as "restricted for future use." Also, a better assessment would be made if the area of such lands were totaled and shown in the report according to the level of restrictive use and length of time involved.

Our detailed comments are presented according to the format of the report.

Summary

Figure S-1, on page S-3, indicates that 4.6 acres of land is permanently committed annually per 1,000 MW plant. This assumes revegetation of the spoils and backfilling much of the pit. Industry's record does not substantiate this assumption. A more realistic figure is much greater than 4.6 acres as indicated in our general comments.

Uranium Mining

The indication on page A-15 that the bulk of the water pumped from the mines is recycled and returned to the groundwater from which it came is questionable. The common practice is to divert the pumped water to the nearest surface drainage. Some infiltration to groundwater may occur but usually at some point further downstream.

Mine dewatering may or may not have significant effects, but there is no evidence in the report that an effort was made to evaluate such effects.

This section ignores prospecting and exploration stages of the mining operation. These operations would affect much larger areas than the actual mining although to a smaller degree.

Industrial accidents and health hazards are not considered. This factor would be significant in the underground mining such as the Grants District in New Mexico. In open-pit mines, radon is usually not a problem; however,

radioactive dust may adversely affect the health of the employees involved with the mining.

If a mill is associated with the mine, some of the water pumped from the workings may be used in the milling process. However, regardless of whether this is the case, the waste water (often containing low levels of radioactivity and acids) is usually discharged into the nearest dry wash from which it eventually seeps into the ground. We think that the depths at which the water looses the radioactive content, including daughter products, should be given along with the effects of the radioactivity on the environment.

Since most uranium mining is on private land or mining claims of Federal land, it is subject only to State laws and the operator's actions. Performance in the past has been poor although there is evidence of improvement. We understand that efforts are being made to slope and revegetate spoil-piles in the Shirley Basin area in Wyoming but do not know of any similar plans for the Gas Hills area, Wyoming, or the open pit operations in the Four Corners area. Any AEC regulations and the method of enforcement should be discussed in regard to mining operations.

Uranium Milling

The first paragraph on page B-17 includes a brief discussion of the liquid effluent from the mill but does not discuss the quantities of chemicals discharged to tailing ponds and their effect on surface and groundwater for the long term.

Although the concentrations of airbourne radioactive effluents released into the environment from processing operations are limited, the effects of the deposition of airbourne radium-226, thorium-230, and other longlived radionuclides near the mill should be evaluated.

The storage of liquid and solid wastes in the retention ponds will lead to an accummulation of alpha-emitting radionuclides amounting to more than 6,300 curies. The report indicates that wells are used to monitor groundwater contamination. Although we are not advocating the discontinuance of well monitoring, we think that it is doubtful that wells can do more than detect contamination after it has occurred. Due to the longlived nature of these radionuclides, this contamination could persist for long periods of time and eventually some of the stored radionuclides would enter the groundwater or be flushed downstream by flood waters. We think the report should have evaluated the extent of contamination that has a reasonable possibility of occurrence.

The effects of a catastrophic failure of the low-head dam holding the tailings are discussed on page B-23. The volume of tailings and the magnitude of impacts resulting from the break of the dam should be indicated.

Uranium Hexafluoride Production

We do not think that the chemical and radiochemical composition and annual quantity of the raffinate are adequately defined. The quantity and composition of the sludges in the raffinate retention ponds and their eventual fate should also be described.

Uranium Enrichment

According to pages D-24 and D-25, sludges from holding ponds are buried on site. We think that the composition of these sludges and the potential effects on groundwater should also be described.

Fuel Fabrication

According to the second paragraph on page E-24, the calcium fluoride precipitate is buried at the fuel fabrication plant site. The potential effects on groundwater should have been considered.

Irradiated Fuel Reprocessing

It is stated on pages F-26 and F-27 that solid wastes containing fission products, uranium, and plutonium will be stored or buried onsite in recoverable form or may be shipped to a Federal repository. The total quantities of radionuclides should be estimated and potential effects on groundwater of onsite burial should have been considered.

Radioactive Waste Management

It is indicated on page G-3 that no effluents to the offsite environment are expected to result from burial of waste classified as "other than high level." It would appear that the specific criteria and safeguards which will be used should also be described in the report.

Burial-site suitability is said to depend on factors assuring that there will be no migration of radionuclides from the site. Ultimately, migration cannot be avoided. The level of significance depends on the physical and chemical character and longevity of the wastes as well as on geologic and hydrologic conditions. The report should have considered the waste characteristics and quantities in evaluating potential effects.

Since some existing burial facilities are located in Illinois, Kentucky, South Carolina, and New York and are exposed to a generally humid climate; it does not appear that the description of the model facility given on page G-12 is realistic. Periods of intense precipitation causing flooding to any exposed trenches are likely to occur in all of these States.

We hope these comments will be helpful to you.

Sincerely yours,

/s/ [Illegible]
Deputy Assistant Secretary
of the Interior

Secretary Paul C. Bender
U.S. Atomic Energy Commission
Washington, D. C. 20545

ADMINISTRATIVE CONFERENCE OF THE
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OFFICE OF
THE CHAIRMAN

RECOMMENDATION NO. 76-3: PROCEDURES IN ADDITION TO NOTICE AND THE OPPORTUNITY FOR COMMENT IN INFORMAL RULEMAKING.

(Adopted June 3-4, 1976)

The Conference's Recommendation 72-5 stated that in rulemaking of general applicability involving substantive rules "Congress ordinarily should not impose mandatory procedural requirements other than those required by 5 U.S.C. § 553," and that "Congress should never require trial-type procedures for resolving questions of policy or of broad or general fact." Paragraph 5 of the Recommendation recognized that agencies nevertheless may sometimes appropriately utilize such procedures for resolving issues of specific fact, and it counseled that in rulemaking proceedings of general applicability "each agency should decide in the light of the circumstances of particular proceedings whether or not to provide procedural protections going beyond" the notice-and-comment requirements of Section 553, "such as opportunity for oral argument, agency consultation with an advisory committee, opportunity for parties to comment on each other's written or oral submissions, a public-meeting type of hearing, or trial-type hearing for issues of specific fact."

The present Recommendation enlarges upon paragraph 5 of Recommendation 72-5 by further specifying for agency consideration certain procedures going beyond

notice-and-comment, and by describing some of the "circumstances of particular proceedings" that should move agencies to consider such additional procedures.

The Recommendation grows out of a study of decisions, primarily of the Court of Appeals for the District of Columbia Circuit, in which rulemaking proceedings have been remanded to agencies for additional procedures, and of the responses of the affected agencies. The Recommendation implies no view as to whether those decisions were authorized by the Constitution or relevant statutes. The Recommendation is premised, however, on the view that one can learn from the insights of judges, who on the basis of their study of records reflecting "the circumstances of particular proceedings," perceived a need for procedures in addition to notice and the opportunity for comment, and from the experience of agencies required to provide such additional procedures.

Recommendation

1. Agencies should afford interested persons the opportunity to participate as effectively as possible in notice-and-comment rulemaking proceedings. Therefore, in order to enlarge the opportunity for public participation and increase its effectiveness, agencies in appropriate circumstances should utilize procedures such as the following, which go beyond a single notice and opportunity to comment and supplement or particularize those listed as examples in Recommendation 72-5.[1]

a. Providing from the outset for the possibility of two cycles of notice-and-comment (i) when the agency anticipates that the issues raised by the rulemaking will be

[1] This Recommendation is addressed solely to agency process *prior* to the final promulgation of a rule. In addition, the agency statement of the basis and purpose of the rule incorporated in the rule when it adopted should be clear and complete and should fully and fairly inform the public as to the basis and purpose of the rule.

unusually complex, or (ii) when it is in the public interest to utilize the initial notice of proposed rulemaking to give only a general description of the subjects and issues involved in the proceeding and to invite public comment upon those subjects and issues; provided that at the conclusion of the first cycle the agency may take any action within its powers. In addition an agency may at any time announce, as by an "advance notice of proposed rulemaking," that it intends to issue a notice of rulemaking, and in such announcement solicit comments and suggestions with respect to the contents of such notice.

b. Providing for a second cycle of notice-and-comment or by notice providing an opportunity for additional comment in any proceeding when comments filed in the proceeding, or the agency's response to such comments, present new and important issues or serious conflicts of data. An agency should consider the desirability of responding to comments as a means of exposing the agency's tentative views in order to enhance the usefulness of further comments by the public.

c. Incorporating in the notice of notice-and-comment cycle a summation of the agency's current attitudes toward critical issues in the proceeding and a description of the data on which the agency relies, indicating where the data may be inspected.

d. Providing an explanation of the tests and other procedures followed by the agency and the significance the agency has attached to them, and allowing opportunity for comment thereon.[2]

e. Holding conferences open to the public, on adequate notice, when an opportunity for all interested

[2] This may be accomplished, for example, in a public notice or by technical reports issued or relied upon by the agency and incorporated by reference in the proceeding.

groups (such as agency staff, directly affected persons, agency policy-makers and public interest groups) to question one another would be effective in resolving, narrowing or clarifying the disputed issues.

f. Hearing argument and other oral presentation, when the presiding agency official or officials may ask questions, including questions submitted by interested persons.

Important circumstances tending to suggest the desirability of using such procedural devices are that (1) the scientific, technical or other data relevant to the proposed rule are complex; (2) the problem posed is so open-ended that an agency may profit from receiving diverse public views before publishing a proposed rule for final comment; and (3) the costs that errors in the rule may impose, including health, welfare and environmental losses imposed on the public and pecuniary expenses imposed on the affected industries and consumers of their products, are significant.

2. In rulemaking proceedings subject to notice-and-comment requirements agencies should give interested persons an opportunity to indicate issues of specific fact as to which they contend that cross-examination should be considered by the agency to be appropriate. Cross-examination, where permitted, should be strictly limited as to subject and duration.

3. An agency should employ any of the devices specified in paragraph 1 or permit cross-examination only to the extent that it believes that the anticipated costs (including those related to increasing the time involved and the deployment of additional agency resources) are offset by anticipated gains in the quality of the rule and in the extent to which the rulemaking procedure will be perceived as having been fair.

FOR IMMEDIATE RELEASE APRIL 7, 1977

OFFICE OF THE
WHITE HOUSE PRESS SECRETARY

THE WHITE HOUSE
REMARKS OF THE PRESIDENT
ON NUCLEAR POWER POLICY
AND
QUESTION AND ANSWER SESSION

THE BRIEFING ROOM
[TRANSCRIPT]

11:20 A.M. EST

THE PRESIDENT: Good morning, everybody.

I have two items to discuss with you this morning, and then I would like to answer a few questions.

One relates to the economy and the need for continuing emphasis on the stimulation package. Based on the best information available to us now, we will have an accumulated spending shortfall for this current fiscal year, fiscal year 1977, plus revenue collections in excess of the anticipated amount of about $10 billion. In other words, we have collected about $10 billion more from the American taxpayers than we anticipate spending in 1977.

I feel very strongly that this money should go back to the American taxpayers. We need it for the economy to maintain its present strength and the only equitable way that I see is through the already-prepared tax refund which would average about $50 per person which, as I have said before, would be about 30 percent of the 1976 income taxes paid by a family making about $10,000 a year.

The second point I would like to make before I answer questions is concerning our Nation's effort to control the spread of a nuclear explosive capability. As far back as 30 years ago, our Government made a proposal to the United Nations that there would be tight international controls over nuclear fuels and particularly those that might be made into explosives.

Last year during the Presidential campaign, both I and President Ford called for strict controls over fuels to prevent the proliferation, further proliferation, of nuclear explosive capability.

There is no dilemma today more difficult to address than that connected with the use of atomic power. Many countries see atomic power as their only real opportunity to deal with the dwindling supplies of oil, the increasing price of oil and the ultimate exhaustion of both oil and natural gas.

Our country is in a little better position. We have oil supplies of our own and we have very large reserves of coal. But even coal has its limitations, so we will ourselves continue to use atomic power as a share of our total energy production.

The benefits of nuclear power, particularly to some foreign countries that don't have oil and coal of their own, are very practical and critical. But a serious risk is involved in the handling of nuclear fuels—the risk that component parts of this power process will be turned to providing explosives or atomic weapons.

We took an important step in reducing this risk a number of years ago by the implementation of the nonproliferation treaty which has now been signed by approximately 100 nations. But we must go further.

We have seen recently India evolve an explosive device derived from a peaceful nuclear power plant, and we now

feel that several other nations are on the verge of becoming nuclear explosive powers.

The United States is deeply concerned about the consequences of the uncontrolled spread of this nuclear weapon capability. We can't arrest it immediately and unilaterally. We have no authority over other countries. But we believe these risks would be vastly increased by the further spread of reprocessing capabilities of the spent nuclear fuel from which explosives can be derived.

Plutonium is specially poisonous and, of course, enriched uranium, thorium and other chemicals of metals can be used as well.

We are now completing an extremely thorough review of our own nuclear power program. We have concluded that serious consequences can be derived from our own laxity in the handling of these materials and the spread of their use by other countries, and we believe that there is strong scientific and economic evidence that a time for a change has come.

Therefore, we will make a major change in the United States domestic nuclear energy policies and programs which I am announcing today.

We will make a concerted effort among all other countries to find better answers to the problems and risks of nuclear proliferation, and I would like to outline a few things now that we will do specifically.

First of all, we will defer indefinitely the commercial reprocessing and recycling of the plutonium produced in U. S. nuclear power programs.

From my own experience, we have concluded that a viable and adequate economic nuclear program can be maintained without such reprocessing and recycling of plutonium. The plant at Barnwell, South Carolina, for

instance, will receive neither Federal encouragement nor funding from us for its completion as a reprocessing facility.

Second, we will restructure our own U. S. breeder program to give greater priority to alternative designs of the breeder other than plutonium, and to defer the date when breeder reactors would be put into commercial use.

We will continue research and development, but shift away from plutonium, defer dependence on the breeder reactor for commercial use.

Third, we will direct funding of U. S. nuclear research and development programs to accelerate our research into alternative nuclear fuel cycles which do not involve direct access to materials that can be used for nuclear weapons.

Fourth, we will increase the U. S. capacity to produce nuclear fuels, enriched uranium in particular, to provide adequate and timely supplies of nuclear fuels to countries that need them, so that they will not be required or encouraged to reprocess their own materials.

Fifth, we will propose to the Congress the necessary legislative steps to permit us to sign these supply contracts and remove the pressure for the reprocessing of nuclear fuels by other countries that do not now have this capability.

Sixth, we will continue to embargo the export of either equipment or technology that could permit uranium enrichment and chemical reprocessing.

And seventh, we will continue discussions with supplying countries and recipient countries, as well, of a wide range of international approaches and frameworks that will permit all countries to achieve their own energy needs while at the same time reducing the spread of the capabilities for nuclear explosive development.

Among other things, we have discussed this with fifteen or twenty national leaders already; we will explore the establishment of an international nuclear fuel cycle evaluation program so that we can share with countries that have to reprocess nuclear fuel the responsibility for curtailing the ability for the development of explosives.

One other point that ought to be made in the international negotiation field is that we have to help provide some means for the storage of spent nuclear fuel materials which are highly explosive, highly radioactive in nature.

I have been working very closely with, and personally, with some of the foreign leaders who are quite deeply involved in the decisions that we make. We are not trying to impose our will on those nations like Japan, France, Britain and Germany, which already have reprocessing plants in operation.

They have a special need that we don't have in that their supplies of petroleum products are not available. But we hope that they will join with us, and I believe that they will, in trying to have some worldwide understanding of the extreme threat of the further proliferation of nuclear explosive capability.